Prescribing Eyeglass Correction for Astigmatism in Infancy and Early Childhood: A Survey of AAPOS Members

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Purpose: To determine prescribing practices of pediatric ophthalmologists for astigmatism and astigmatic anisometropia in infants and young children. Methods: A survey was sent to the 700 North American AAPOS members listed in the 2004 web site directory. Results: A total of 412/700 surveys (59%) were returned. The level of astigmatism at which pediatric ophthalmologists prescribe eyeglasses for astigmatism varies considerably across the age range from birth to 3 years. The level at which 50% would prescribe glasses was ≥4.00 D from 0 to <6 months and decreased to ≥2.00 D by 2 to <3 years. Furthermore, one-fifth indicated that they would not prescribe eyeglasses for astigmatism in infants <6 months of age. Prescribing practices for astigmatic anisometropia were slightly less variable across age, with 50% of respondents indicating that they would prescribe eyeglasses for astigmatic anisometropia ≥3.00 D from 0 to <6 months, decreasing to ≥1.50 D by 2 to <3 years. Conclusions: The American Academy of Ophthalmology Preferred Practice Patterns guidelines accurately reflect prescribing practices of pediatric ophthalmologists for 1- and 2-year-old children for bilateral astigmatism and astigmatic anisometropia. However, the AAO guidelines do not accurately reflect the prescribing practices for children in the 0 to <1-year age range. For children 0 to <6 months of age, pediatric ophthalmologists indicate that they typically require a higher amount of astigmatism or astigmatic anisometropia than that recommended by the AAO guidelines, or they do not prescribe glasses at all. (J AAPOS 2005;9:189-191)

Previous research has demonstrated that uncorrected astigmatism during infancy and early childhood is a risk factor for the development of amblyopia.1-5 However, the amount of astigmatism that poses a significant risk at different ages is not known. This issue is further complicated by reports that high astigmatism in early infancy is not uncommon,6-12 and that astigmatism in infants tends to emmetropize, becoming less prevalent after the first year of life.7,8,10,13-15

In the absence of empirical data on the amblyogenic risk of varying degrees of astigmatism in early development, eyeglass-prescribing guidelines for astigmatism can be generated based on the experience and consensus of practicing clinicians. Two reports of such guidelines are currently available.16,17 Miller and Harvey16 surveyed AAPOS members in 1995 regarding eyeglass prescribing practices for astigmatism, myopia, hyperopia, and anisometropia. However, the survey included broad age ranges for prescribing patterns in infancy and early childhood (0 to 2 years, 2 to 4 years). Using these guidelines for prescribing in infancy is somewhat problematic, as prescribing practices are likely to vary across the 0 to 2-year age range.

More recently, the American Academy of Ophthalmology (AAO) published prescribing guidelines for astigmatism, myopia, hyperopia, and anisometropia, including astigmatic anisometropia, in infants and young children.17 However, these guidelines are based on the consensus of a relatively small number of ophthalmologists (six) serving on the AAO Pediatric Ophthalmology Panel for the AAO Pediatric Ophthalmology Preferred Practice Patterns, rather than on the broad consensus of practicing clinicians. Similarly, guidelines used for correction of refractive error of infants and young children in the large, multicenter study of Cryotherapy for Retinopathy of Prematurity (CRYO-ROP)18,19 were based on the consensus of the relatively small number of ophthalmologists who designed the study.

In the present study, we surveyed AAPOS members (2004) regarding their prescribing practices for astigmatism in infancy and early childhood. Six-month categories were used for the age range from birth to 1 year, and 1-year categories were used at the older ages. As in the AAO guidelines,17 a question concerning prescribing practices for astigmatic anisometropia was included.
Typically, what is the minimum amount of astigmatism and minimum interocular difference in astigmatism you would need to see in order to prescribe glasses for a child in each of the following age groups.

<table>
<thead>
<tr>
<th>Type of Astigmatic Refractive Error</th>
<th>Age of Patient</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>0 to &lt; 6 Months</td>
</tr>
<tr>
<td>Amount (Diopeters) of Astigmatism Present: Assume equal amount in both eyes</td>
<td>Diopeters</td>
</tr>
<tr>
<td>Difference in Amount of Astigmatism Between Eyes</td>
<td>Diopeters</td>
</tr>
</tbody>
</table>

**FIG 1.** Survey sent to 2004 North American AAPOS Members.

**METHODS**

Names and addresses of the 700 2004 North American AAPOS members were obtained from the AAPOS website. The survey shown in Figure 1, along with a cover letter, was mailed to each member in March 2004. Approximately 1 month later, a second letter and survey were sent to members who did not respond to the first mailing.

**RESULTS**

A total of 412/700 surveys (59%) was returned. For some age groups, some pediatric ophthalmologists indicated “none” or “would not prescribe” for amount of astigmatism needed to prescribe eyeglasses. We interpreted this as indicating that, for that age group, they would not prescribe for any amount of astigmatism present. A summary of the percentage of responders who would not prescribe for each age group is provided in Table 1.

As shown in Table 2, the AAO guidelines are similar to the 50th or 75th percentile data for prescribing at all ages except 0 to <6 months. For this youngest age, AAO guidelines were more similar to the 25th percentile data than to the 50th or 75th percentile data. This suggests that the general category of 0 to 1 year used in the AAO guidelines may also be too broad, as prescribing recommendations based on the present survey yielded different results for 0- to <6- and 6- to <12-month olds, with higher prescribing thresholds for the younger infants.

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**DISCUSSION**

The results of the present study suggest that the 2-year age grouping used in the previous survey conducted by Miller and Harvey was too large to provide an accurate picture of prescribing practices of pediatric ophthalmologists for infants and children less than 2 years of age. As shown in Tables 1 and 2, when pediatric ophthalmologists were asked to break down their responses for children less than 2 years of age into three age categories (0 to <6 months, 6 to <12 months, and 12 to <24 months), there were significant differences across age categories both in whether spectacles would be prescribed and in the level of astigmatism at which spectacles would be prescribed.

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Finally, it is important to note that prescribing practices for astigmatism in infants and young children are likely to depend on other factors in addition to the magnitude of astigmatism or astigmatic anisometropia. For example, it is likely that spectacle-prescribing practices take into account the presence or absence of anisometropia and strabismus, as well as the axis of the astigmatism. Previous research has indicated that oblique axis astigmatism presents a greater risk factor for development of anisometropia than with-the-rule or against-the-rule astigmatism. The survey results do not reflect the extent to which these other factors influence prescribing practices.

**TABLE 1.** Percentage of “Would not Prescribe” responses, based on survey results from 412 AAPOS members

<table>
<thead>
<tr>
<th>Condition</th>
<th>Age Range (months)</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bilateral astigmatism</td>
<td>0 to &lt; 6</td>
<td>96 (23)</td>
</tr>
<tr>
<td></td>
<td>6 to &lt;12</td>
<td>30 (7)</td>
</tr>
<tr>
<td></td>
<td>12 to &lt; 24</td>
<td>6 (1)</td>
</tr>
<tr>
<td></td>
<td>24 to &lt;36</td>
<td>1 (0.2)</td>
</tr>
<tr>
<td>Astigmatic anisometropia</td>
<td>0 to &lt; 6</td>
<td>83 (20)</td>
</tr>
<tr>
<td></td>
<td>6 to &lt;12</td>
<td>22 (5)</td>
</tr>
<tr>
<td></td>
<td>12 to &lt; 24</td>
<td>2 (1)</td>
</tr>
<tr>
<td></td>
<td>24 to &lt;36</td>
<td>1 (0.2)</td>
</tr>
</tbody>
</table>
In summary, the results of the present survey indicate that there is considerable variability across age in the level of astigmatism and astigmatic anisometropia at which pediatric ophthalmologists indicate they would likely prescribe eyeglasses for infants and young children. It is important to recognize that this survey represents the opinion of respondents, but may not reflect the actual prescribing practices that would be determined by a chart review of each respondent’s patients. One factor underlying the variability across age in prescribing practices is likely to be the lack of data on the age at which bilateral and unilateral astigmatism need to be corrected to prevent the development of amblyopia. Further research on the effect of uncorrected astigmatism on the development of vision in infants and young children would allow the development of prescribing guidelines based on empirical results rather than on general consensus.

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References